At this meeting, which took place on December 12 and 13, there were present:—Prof. B. Schwalbe, representing Dr. Milkau (Germany), Prof. G. Darboux, representing Prof. H. Poincaré, and Dr. J. Deniker (France), Prof. A. W. Rücker, Sir M. Foster, Prof. H. E. Armstrong and Dr. L. Mond (Great Britain), Prof. J. H. Graf (Switzerland), Dr. E. W. Dahlgren (Sweden), Prof. Korteweg (Holland), Dr. M. Knudsen (Denmark), Mr. Roland Trimen (Cape Colony), Dr. W. T. Blanford (India), Señor del Paso y Troncoso (Mexico), and M. Metaxas (Greece). Dr. Ludwig Mond represented Italy in the absence of Prof. Nasini. Sir Michael Foster was elected chairman of the meeting.

It is proposed that the annual cost of a set of seventeen volumes shall be 17*l.*, and on this basis it was announced that the number of sets subscribed for by the various countries was as follows:—

	Sets.
United States of America	68
Great Britain	45
Germany	45
France	35
Italy	27
Japan	15
Switzerland	7
Sweden	6½
Denmark	6
Holland	6
Norway	5
Mexico	5
Cape Colony	5
Canada	4½
Hungary	4
Portugal...	2
South Australia...	2
Western Australia	1
Victoria	1

One great difficulty in starting an enterprise of this magnitude is that a large amount of capital is needed to cover the preliminary expenses and to pay for the printing of the first set of volumes, and for other work which must be done before the grants from the various countries are received, and before any sales of the volumes to the public can be effected. This initial difficulty was met by the Royal Society, which generously offered to advance the necessary capital. This offer was accepted by the International Council, which expects to be in a position to repay the sum advanced during the next few years.

The Royal Society offered to act as the publishers of the catalogue, and to sign the necessary contracts with the printers and publishing agents. This offer was unanimously accepted by the International Council, which, after carefully examining the clauses of the proposed contracts, declared its approval of them.

The three principal countries which have not yet joined in the scheme are Russia, Belgium and Spain; and the Royal Society was asked by the International Council to address the Imperial Academy of Sciences of St. Petersburg on the subject, and also to take steps to induce the other countries to join in the catalogue.

A code of instructions for the use of all who are taking part in the preparation of the catalogue was considered, and, after some amendment, adopted.

In this connection the chief point discussed was whether it is desirable to publish complete lists of new botanical and zoological species. It was decided that lists of new species should be published, and that they should, as far as possible, contain all the additions to our knowledge in this direction made within the year.

It was also decided to include translations in the catalogue, but to indicate that they are translations. Schedules of classification for the subject indexes of the several sciences were adopted.

An executive committee was appointed, consisting of the four delegates of the Royal Society and the representatives of the four largest subscribers to the catalogue—France, Germany, Italy and the United States. Dr. H. Forster Morley was appointed director of the catalogue.

Finally, it was resolved to begin the work on January 1, 1901, and to include in the catalogue all literature published after that date.

FURTHER REMAINS FROM LAKE CALLABONNA.[1]

THE undermentioned Memoir is the second of a series, dealing with the remains of the great extinct vertebrates discovered in the Lake Callabonna in South Australia during the expedition already commented upon in our pages (NATURE, vol. lxi. p. 275, 1894), and now famous for having yielded the materials for a fuller knowledge of the osteology of the remarkable marsupial, colossus Diprotodon. The present contribution deals entirely with the great flightless bird Genyornis, which was found in association with this, and is for the most part an extended and illustrated account of portions of its skeleton, which the authors have already more briefly described in the Transactions of the Royal Society of South Australia and elsewhere. It is divided into two parts, a first dealing with the bones alone, a second containing an account of the surroundings and physical features of the Lake and the characters of its bed, of its geology, and the history of its investigation, all of which are special and detailed, and have for the greater part received prior consideration in our pages in the aforementioned article and in its predecessors therein referred to by the authors themselves (NATURE, vol. l. pp. 184 and 206), permission to quote freely from which they herein acknowledge.

It is with the first part of the Memoir we are chiefly concerned, and the newer facts it sets forth are the outcome of the results of comparison with the numerous remains described of those of allied genera mostly preserved in the Australian Museums. In dealing with these the authors pay a just tribute to the work and energetic enthusiasm of Mr. R. Etheridge, junr., the indefatigable curator of the Sydney Museum, whose Memoir on the subject in the "Records of the Geological Survey of New South Wales" is taken as the basis of their inquiry; and, as the outcome of this portion of the work, they have been led to associate with the Callabonna genus certain skeletal fragments, previously collected in South Australia, Queensland, and New South Wales, of Pliocene and Pleistocene age, especially a portion of a tibia from Mount Gambier, of a femur and some tibiæ from Normanville, of a tibia from the Paroo River, and of a fragment of a pelvis from the Canadian Gold Lead in New South Wales, most of which had been referred by Owen and Etheridge, junr., to the genus Dromornis.

The generic name Genyornis is expressive of the great size of the lower jaw, and a fuller description of this is, we presume, reserved for a promised detailed memoir in course of preparation. The present one treats mainly of the limb bones, shoulder girdle and sternum, and the most noteworthy facts recorded are the numerical reduction of the phalanges of the outermost (fourth) digit to four, and the great slenderness, indicative of reduction, of the innermost or second, which, for the Ratitæ, are exceptional features. These characters notwithstanding, the authors, from a careful study of the measurements of the long bones and particularly of all that concerns the sternum, which is here for the first time fully described, regard the Emeu as the nearest living ally of this aberrant genus, and to the justice of

[1] "Fossil Remains from Lake Callabonna." Part II.. (1) Genyornis Newtoni. (2) The Physical Features of Lake Callabonna. By E. C. Stirling, F.R.S., and A. H. C. Zeitz, C.M.M.Z.S. (Mem. Royal Soc., S. Austr., vol. i. Part 2, pp. 41–80 and i.–xv., 6 photographic plates, 1900.)

their decision their photograph of the sternum, which is typically Dromæan, alone gives ample support.

Other remarkable features are the slenderness of the tarso-metatarsus and lower portion of the tibio-tarsus, and the general feebleness of the digits, the ungual phalanges of which are small, and believed to have borne "flattened nails rather than sharp and powerful claws, which could have been of little service for scratching purposes," the whole pedal skeleton, in fact, being in striking contrast with the massive proportions of the upper-leg bones and sternum. There is a moderate fibula well preserved.

Two small fragments of the coraco-scapula and some three or four ribs are described. Of the carpus there is no trace, and doubt besets a small bone referred to as a possible phalanx of the fore-limb. Concerning the anti-brachium, however, the radius and a possible ulna are preserved; and for the former the authors give measurements which show that, in contradistinction to that of all other Ratitæ, it far exceeds the humerus in length—a feature in respect to which the Emeu comes most nearly approximate but is still a long way behind.

Of remains in good preservation, or that, by the ingenious method of preparation adopted, upon which we have already commented (NATURE, vol. lxi. p. 276), could be rendered serviceable, those of the tibio-tarsalia were by far the most numerous; and in the present memoir the authors devote special attention to chemical action brought to bear upon those bones found nearest the surface, to which is due their friability and peculiar texture, associated with the formation of crystals, mostly of halite, admixed with gypsum, glauberite and alunite, by which they had become impregnated. The Memoir gives promise of further interesting results, and any one at home desirous of examining the remains will now find in the Geological Department of our National Museum at South Kensington a fine example of a hind-limb, in which the extraordinary diversity in bulk of the opposite ends of the tibio-tarsus, and the still more noteworthy slenderness of the innermost digit, must be seen to be appreciated.

SOME EXPERIMENTS ON THE DIRECT-CURRENT ARC.

ON Thursday last, December 13, Mr. W. Duddell read before the Institution of Electrical Engineers a paper on "Rapid Variations in the Current through the Direct-Current Arc," which he illustrated by experiments. Members of the Institution have already learnt from the experimental demonstration given by Mr. Duddell in 1898, when he read the paper by Dr. Marchant and himself on the alternate current arc, to expect from him most interesting experiments. Nor were they disappointed last Thursday. It is perhaps too much to say that the experiments then shown excelled in beauty and interest those exhibited on the former occasion, but they fully maintained the same high level of excellence.

Mr. Duddell has been carrying out experimental research on the arc for the past five or six years, and during the last two has, we understand, completed a series of experiments on the vexed question of the resistance of the arc. The questions dealt with in the paper read last Thursday were mainly side issues which had cropped up in the course of these researches. They embody, however, a number of most interesting and important results, many of which are suggestive of great possibilities.

The paper was divided into two parts, the first dealing with those cases in which the cause of the variation of the current was in the circuit outside the arc, the second with the cases where the cause was in the arc itself. Under the first heading, Mr. Duddell gave the results of experiments which he had made on the rapidity with which the P.D. between the electrodes of the arc, and the light emitted by the arc itself and the crater on the positive carbon, can follow variations of the current. The results show that the rapidity is surprisingly great. It is well known that with ordinary slow variations of the current through an arc a rise in current is accompanied by a fall in P.D. If the conditions of the arc were to remain unchanged, the P.D. would rise with a rise of current; but Mr. Duddell has found that the conditions of the arc can change as rapidly as 5000 times a second or more, and that when the current through an arc between *solid* carbons is suddenly increased it is only for the first 1/5000th of a second that the P.D. rises with the current. Messrs. Frith and Rodgers endeavoured, in 1896, to find the resistance of the arc by superimposing on a direct-current arc an alternating current having a frequency of 250 alternations per second, and measuring the change in P.D. thereby produced on the assumption that at this frequency the conditions of the arc did not change. The results of Mr. Duddell's work show that a frequency of at least 5000 alternations per second must be employed before such an assumption is justified.

It is remarkable also to find that the light emitted by the arc is affected by such small and rapid variations as Mr. Duddell found was the case. The light emitted by the crater and the vapour column varies sufficiently distinctly for a photographic record to be obtained even when the frequency of the superimposed variations in current is as high as 4300 alternations per second and the amplitude of the variation as low as 3 per cent. of the mean.

When the current through the arc is altered, a change in the cross section of the vapour column is caused; and these changes, when the variations are rapid and periodic, give rise to audible sounds. Mr. Duddell has found that a variation of the order of one part in 10,000 from the mean current will alter the vapour column sufficiently to produce sound-waves. In this way an arc may be made to act as a telephone receiver by causing the varying currents in a telephone circuit to pass through the arc. An experiment was shown at the meeting in which the arc in the meeting room was used as a receiver for telephone currents from a transmitter spoken into in the basement of the building. The sounds were distinctly audible throughout the room, though the words could hardly be distinguished beyond a distance of some 10 or 12 feet. These results were obtained with a cored carbon arc—some 20-30 mm. in length and with a current of about 10 ampères.

The second part of the paper, dealing with changes of current produced by the arc, was full of interest and importance, and was illustrated by some very striking experiments. Mr. Duddell first described some experiments on the humming arc, in which he had found, by means of curves obtained with his oscillograph, that the P.D., current, and light emitted by the arc varied with the same frequency, this frequency being identical with the pitch of the note emitted. With the hissing arc Mr. Duddell finds a double variation—a large slow one, which is due, he considers, to the rotation of the arc as a whole, on which is superimposed a small rapid variation in the P.D. and current corresponding with the variation of the light emitted by the crater, this variation being produced, as Mrs. Ayrton has shown, by air obtaining access to the surface of the crater.

Perhaps the most remarkable points brought out by Mr. Duddell in his paper were those relating to the effects produced by shunting the arc with a condenser and self-induction. He has shown that the arc, if it be formed between *solid* carbons, when so shunted immediately becomes intermittent and emits a musical note. Mr. Duddell was led to this discovery by attempting to use the arc as a generator of alternating current by